

## Claims

What is claimed is:

1. A method for the calculation and back-solving of complex relationships in a sub-cube of a multidimensional database system comprising the steps of:
  - inputting from a user the required values of specified cells and any constraints;
  - creating one or more parent/child tables giving the relationships and dependencies between target cells and other cells in the sub-cube;
  - determining from the one or more parent/child tables the one or more target cells requiring one or more calculations to be performed;
  - for each target cell requiring calculations:
    - performing the one or more calculations and recording that a change has taken place;
    - remembering the one or more parent cells of the target cell to ensure they are recalculated;
    - recalculating the values for each remembered parent cell and recording that a change has taken place;
  - repeating the performing, remembering, and recalculating steps until all changes to the target cells and their parent cells are complete;
  - repeating the performing, remembering, recalculating, and first repeating steps until no changes are recorded; and
  - reporting the results of the foregoing steps to the user.
2. The method of claim 1 wherein the Parent/Child table creating step is carried out as part of the performing one or more calculations step, so that in smaller, less complex sub-cubes, there is some advantage taken in the reduced number of times a particular cell is accessed.

3. A system for calculating and back-solving complex relationships in a sub-cube of a multi-dimensional database system comprising:
- means for inputting from a user the required values of specified cells and any constraints;
  - means for creating one or more parent/child tables giving the relationships and dependencies between target cells and other cells in the sub-cube;
  - means for determining from the one or more parent/child tables the one or more target cells requiring one or more calculations to be performed;
  - for each target cell requiring calculations:
    - means for performing the one or more calculations and recording that a change has taken place;
    - means for remembering the one or more parent cells of the target cell to ensure they are recalculated;
    - means for recalculating the values for each remembered parent cell and recording that a change has taken place;
  - wherein the means for performing, the means for remembering, and the means for recalculating are operable until all changes to the target cells and their parent cells are complete;
  - and wherein the means for performing, the means for remembering, and the means for recalculating, are operable until no changes are recorded; and
  - means for reporting the results of the forgoing means to the user.
4. A computer program product for calculating and back-solving complex relationships in a sub-cube of a multi-dimensional database system the computer program product comprising:

- a computer-readable storage medium having computer-readable program code means embodied in it, said computer readable program code means comprising:
  - computer readable program code means for inputting from a user the required values of specified cells and any constraints;
  - computer readable program code means for creating one or more parent/child tables giving the relationships and dependencies between target cells and other cells in the sub-cube;
  - computer readable program code means for determining from the one or more parent/child tables the one or more target cells requiring one or more calculations to be performed;
  - for each target cell requiring calculations:
    - computer readable program code means for performing the one or more calculations and recording that a change has taken place;
    - computer readable program code means for remembering the one or more parent cells of the target cell to ensure they are recalculated;
    - computer readable program code means for recalculating the values for each remembered parent cell and recording that a change has taken place;
  - wherein the computer readable program code means for performing, the computer readable program code means for remembering, and the computer readable program code means for recalculating are operable until all changes to the target cells and their parent cells are complete;
  - and wherein the computer readable program code means for performing, the computer readable program code means for remembering, and the computer readable program code means for recalculating, are further operable until no changes are recorded; and

- computer readable program code means for reporting the results of the foregoing computer readable program code means to the user.